Types of structural Isomerism

1. Chain Isomerism (CI) → Same ⇒ Functionality, Nature of Multiple Bonds, Substituents, F. Grp (2°); Different ⇒ Word Root of Main chain or side chain] or length of Chain is Different.
2. Position Iso (PI) → Same ⇒ Functionality, Nature of Multiple Bonds, Substituents, F. Grp (2°), Word Root; Different → position of Multiple Bonds, Substituents, F. grp (2°), (1°)
3. Metamerism (MI) ⇒ Different length of Carbon chain across F. grp ⇒ Both metamers must have same f. grp.
4. Functional Isomerism (FI) → Different functionality (1° & 2°)
5. Tautomerism or Prototropism or Nucleotropism or Ketotropism

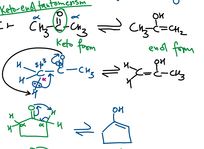
Eg: Ethoxyethane (I), 1-Methoxy propane (II), 2-methoxy propane (III), Butanol (IV). I & II → Metamers & Chain Isomers. II & III → PI. I & IV → FI. I & II → MI & CI

Qs Identify Relationship b/w compounds?

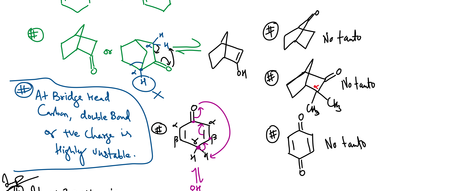
1. A & B → Identical (Same)
2. A & B → CI
3. A & B → MI & CI
4. A & B → CI & MI; B & C → FI; A & C → FI
5. Phenyl cyclohexane Carboxylate (A), cyclohexyl Benzoate (B) — A & B → MI
6. A & B → CI
7. A → CI; A & B → PI; B & C → CI; C & D → CI
8. A & B → PI & MI; 2° ketone, PI is given priority over MI
9. FI or (CI) Ring chain Iso. DU=1 no. of C=3; DU=1 no. of C=3
10. FI

5. Tautomerism
   - Phenomenon in which 2 constitutional Isomers (FI) are in Dynamic Eq^{m} of each other. These Constitutional Isomers are called Tautomers.
   - Conversion of one tautomer to other tautomer involves Shift of π e^{-}s along with group (often (Usually) Hydrogen)

Keto-enol tautomerism

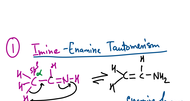


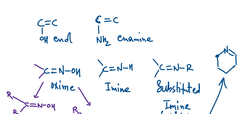
- At Bridge Head Carbon, double Bond or +ve Charge is highly unstable.
- If α, β position is having unsaturation, then Y–H of Single Bonded Carbon or Nitrogen can participate in tautomerism.



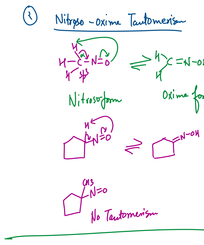
Other Tautomerism

1. Imine–Enamine Tautomerism

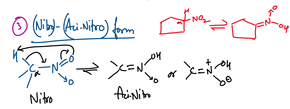




1. Nitro–oxime Tautomerism

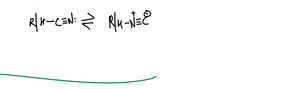


3. Nitro (Aci-Nitro) form



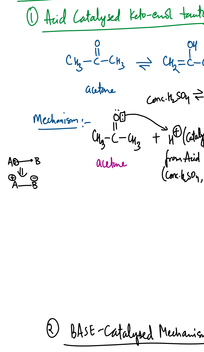
Special case

4. Nitrile – IsoNitrile Tauto



Mechanism of Tautomerism

1. Acid Catalysed keto-enol tautomerism



2. BASE-Catalysed Mechanism

Base → any e^{-} rich atom which can capture H$^{\oplus}$